
Confined Space Entry Program Hercules Marine Services Corporation Freeport, Texas

Prepared For

Hercules Marine Services Corporation

For PILKO & ASSOCIATES, INC.

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A.

INTRODUCTION

The OSHA Permit-Required Confined Spaces Regulation (29 CFR 1910.146) was promulgated in 1993. The regulation contains requirements for identification of permit-required confined spaces, establishment of a permit-required confined space program, training, and rescue/emergency services. Permit-required confined spaces are defined as those spaces that have one or more of the following characteristics:

- 1) contains or has a potential to contain a hazardous atmosphere;
- 2) contains a material that has the potential for engulfing an entrant;
- 3) has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which sloped downward and tapers to a smaller cross-section; or
- 4) contains any other recognized serious safety or health hazard.

Companies who have confined spaces that meet these characteristics must comply with the regulation.

Hercules Marine Services cleans and repairs chemical barges. Cleaning procedures have been developed and employees receive training regarding the hazards of chemicals in the barge and protective measures to be used. The cleaning operation can often take place without employees entering the cargo tanks. However, tank entry is required at times to complete the cleaning. If this is necessary, oxygen levels and explosive levels of hydrocarbons are measured to determine if safe entry can be made. This testing is done from outside the tanks. Toxic levels of chemicals are not measured, but employees typically wear air-purifying respirators when they enter the tanks.

After a barge has been thoroughly cleaned, a marine chemist tests the environment in the tanks for oxygen, explosive levels of hydrocarbons and toxic levels of chemicals. Again, this testing is done from outside the tanks. If the atmospheric conditions are acceptable, he certifies that the tanks can be entered safely for maintenance. The tanks are continually ventilated during the maintenance work which may involve welding and cutting (hot work). If the maintenance work takes several days to complete, Hercules tests the oxygen and explosive levels of hydrocarbons (but not toxic chemical levels) at the beginning of each day. All testing by Hercules is done by a "shipyard competent person" who has taken the "Marine Gas Hazards Control Program" from the National Fire Protection Association.

Hercules Marine Services Corporation

Hercules employees may also do maintenance work in the void tanks of barges. Although no chemicals would normally be involved, these tanks could conceivably be considered "permit-required confined spaces" if a hazardous atmosphere develops during maintenance work.

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B.

CONFINED SPACE ENTRY PROGRAM

WORKPLACE

Barge tanks which are entered for cleaning out residual chemicals or performing maintenance work which may generate a hazardous atmosphere.

HAZARDS

- Residual chemicals in the tanks
- Flammable hydrocarbons in the tanks
- Oxygen deficiency in the tanks
- Fumes and gases from welding and cutting operations
- High temperatures during warm weather
- Mechanical and electrical hazards associated with the work

CONTROL OF HAZARDS

A group safety meeting shall be held prior to cleaning the barge tanks to review the applicable material safety data sheet (MSDS), the hazards of the work, and the cleaning procedure to be used including protective measures.

Chemical, flammable and oxygen-deficiency hazards shall be controlled by forced air ventilation sufficient to keep the atmospheric concentration of flammable materials at 0% of the lower explosive limit (LEL). Oxygen levels shall not be below 20%. Atmospheric levels of chemicals, fumes and dusts shall not exceed applicable OSHA permissible exposure limits (PELs), Threshold Limit Values (TLVs) established by the American Conference of Governmental Industrial Hygienists, or standards established by the manufacturer of the chemical (this information should be provided on the applicable MSDS).

All atmospheric testing shall be done by a "competent person" who is designated by the employer, in writing, as capable (by education and/or specialized training) of anticipating, recognizing and evaluating employee exposure to hazardous substances and other unsafe conditions in a confined space. This person shall be capable of specifying necessary control and/or protective action to ensure worker safety.

All atmospheric testing shall be done without entering the tank. Approved and calibrated testing equipment shall be used. Testing shall be done as often as necessary to ensure that workers in the tank are properly protected. In general, oxygen levels shall be tested first followed by combustible vapors and gases, and then toxic vapors and gases. Testing

results will be documented and made available to each employee entering the confined space.

If entry of a tank is necessary to clean out a residual chemical, approved respirators and other protective equipment must be worn. The respirator must be capable of protecting the employee against chemical levels which exceed applicable atmospheric standards. The employees eyes and skin must be protected against chemical exposure. OSHA respiratory protection requirements must be followed (29 CFR 1910.134).

If an adjacent tank may contain a chemical, proper steps must be taken to positively isolate the tank to be entered from the adjacent tank. The OSHA lockout/tagout standard (29 CFR 1910.147) must be followed.

OSHA welding standards must be followed (29 CFR 1910, Subpart Q). Welding gas tanks must never be brought into a tank.

Appropriate measures such as work breaks and use of fluids must be taken to prevent heat stress.

Adequate lighting must be used in the tank to allow safe work and rapid exit if an emergency develops.

Electrical and mechanical hazards must be guarded against.

PERMITS

A signed entry permit is required before any employee is allowed to enter a tank for cleaning out residual chemical or for performing hot work such as welding.

A permit will not be required once a marine chemist has certified that a tank is safe for inspection and maintenance, unless such maintenance work could result in a hazardous atmosphere, such as during welding.

A hot work permit from the U.S. Coast Guard is required for any hot work such as welding or cutting in or on a barge.

AUTHORIZATION

Only the entry supervisor may authorize an employee to enter a tank. The entry supervisor must determine that conditions in the tank meet permit requirements before authorizing entry.

ATTENDANT

The entry supervisor shall designate an employee to maintain communication with employees working in tanks to ensure their safety. The attendant may not enter any permit entry confined space to rescue an entrant or for any other reason unless authorized by the rescue procedure and, even then, only after calling the rescue team and being relieved as an attendant by another worker. If an attendant monitors more than one permit space, and he must respond to an emergency in one space, the entry supervisor must ensure that the other spaces are properly monitored during the emergency.

COMMUNICATIONS AND OBSERVATION

Communications between attendant and entrant(s) shall be maintained throughout entry. Means of communication shall be specified on the entry permit. Generally voice communication is adequate.

RESCUE PROCEDURES

Authorized entrants must wear chest or full-body harnesses to facilitate rescue if needed. Rescue will be accomplished by employees trained in the proper techniques. Normally, rescue will be attempted using retrieval methods without entry of the rescuers. However, the entry supervisor will make the final decision based on circumstances. Under no circumstances should rescuers enter the tanks without a rescue plan and proper protective equipment. A self-contained breathing apparatus must be used if the atmosphere is deficient in oxygen or high concentrations of chemicals exist.

CONTRACTORS

If contract employees enter permit-required confined spaces, Hercules will 1) inform the contractor that permit space entry is allowed only through compliance with the company's permit space program; 2) apprise the contractor of the hazards of the permit space; 3) apprise the contractor of any precautions or procedures that must be followed for the protection of employees in or near permit spaces where contractor personnel will be working; 4) coordinate entry operations with the contractor when both Hercules personnel and contractor personnel will be working in or near permit spaces so that employees of one employer do not endanger the employees of the other employer; and 5) debrief the contractor at the conclusion of the entry operations regarding the permit space program and any hazards confronted or created in permit spaces during entry operations.

PROGRAM REVIEW

Entry operations must be halted and revised by the entry supervisor if the measures taken under the permit space program do not adequately protect employees.

The permit-required confined space program must be reviewed at least once a year using the canceled permits of the previous year. The program must be revised if it is found to be deficient in any way.

C.

CONFINED SPACE PERMIT SYSTEM

- An entry permit must be prepared before workers can enter a barge tank for cleaning out chemicals or performing hot work such as welding.
- Appropriate atmospheric testing must be done before entry is authorized.
- All sections of the permit must be filled out and the permit must be signed by the entry supervisor.
- The permit must be posted at the entrance to the confined space.
- The entry supervisor must cancel the permit if conditions develop which are not allowed by the permit and when the work is completed. If work continues past one day, a separate permit must be issued at the beginning of each day.
- Completed permits must be maintained for one year to be used in the annual review of the confined space program.

D.

CONFINED SPACE EMERGENCY SERVICES

TRAINING

Employees designated to perform emergency services shall have appropriate training regarding rescue techniques, use of personal protective equipment, first aid and CPR. They shall also receive the training required of authorized entrants. They shall participate in simulated rescue operations at least once every 12 months. Only employees who have had this training can participate in rescue operations.

PROCEDURES

- Employees entering a cargo tank to clean out chemicals must wear a chest or full-body harness to facilitate rescue should an emergency develop.
- If there is a concern that a hazardous atmosphere exists in the tank or could develop, a retrieval line should be attached to the harness worn by the employee. The other end of the retrieval line must be attached to a mechanical retrieval device outside the permits space in such a manner that rescue can begin as soon as the rescuer becomes aware that rescue is necessary.
- If testing has shown that a hazardous atmosphere does not exist in the tank, and if it is highly unlikely that such a condition will develop, then attachment of the retrieval line may not be necessary. However, the authorized entrant should wear the harness and emergency personnel should be prepared for rescue by having the appropriate retrieval equipment in position.
- Normally rescue will be attempted using retrieval methods which do not require entry of the rescuers. However, the entry supervisor will make the final decision based on circumstances. Under no circumstances should rescuers enter the tanks without a rescue plan and proper protective equipment. A self-contained breathing apparatus must be used if the atmosphere is deficient in oxygen or high concentrations of chemicals exist.
- Community emergency medical services must be promptly notified as soon as the company is aware that an employee may be injured. Injured employees should be given appropriate first aid by trained company staff while waiting for the community emergency services to arrive. If a chemical has been involved in the employee's injury, provide a copy of the appropriate material safety data sheet (MSDS) to the community emergency services.

EQUIPMENT

Appropriate emergency equipment will be maintained by the company. Such equipment will include harnesses, retrieval lines and a tripod to facilitate non-entry rescue. Proper protective equipment must be readily available if rescuers are allowed to enter a tank.

E.

CONFINED SPACE TRAINING PROGRAM

The basic confined space entry training program must cover the following subjects:

- Overview of hazards of confined spaces: oxygen deficiency, explosive atmospheres, toxic chemicals, heat stress, mechanical/electrical hazards.
- Hazard control methods: chemical hazard training, atmospheric testing, ventilation, personal protective equipment, etc.
- The written permit space entry program, including an explanation of the written permit.
- Specific responsibilities of each employee: authorized entrants, attendants, entry supervisors, competent persons, emergency/rescue personnel.
- Proper use of personal protective equipment: respirators, slicker suits, gloves, etc.
- Emergency/rescue procedures.

This training must be provided to all existing employees and to any new employee. If an employee is given a new assignment, he must receive training for that assignment.

In addition to the above general training, specific training prior to each barge cleaning operation should continue.

Additional training must be provided if there is a change in permit space operations or procedures, or if experience shows that additional training is needed on permit space entry procedures.

All training must be documented by recording the training topic(s), the attendees, the trainer (record signature of the trainer), and the dates of the training.

F.

DUTIES OF PERSONNEL FOR CONFINED SPACE ENTRY

AUTHORIZED ENTRANTS

- Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.
- Properly use equipment provided for safe work.
- Communicate with the attendant as necessary to enable him to monitor your status and alert you of the need to evacuate the confined space.
- Alert the attendant upon recognition of any warning sign or symptom of exposure to a dangerous situation, or detection of a prohibited condition.
- Exit the permit space as quickly as possible whenever 1) an order to evacuate is given by the attendant or entry supervisor; 2) you recognize any warning sign or symptom of exposure to a dangerous situation; 3) you detect a prohibited condition; or 4) an evacuation alarm is activated.

ATTENDANTS

- Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.
- Be aware of possible behavioral effects of hazard exposure in authorized entrants.
- Continuously maintain an accurate count of authorized entrants in the permit space and ensure that the means used to identify authorized entrants accurately identifies who is in the permit space.
- Remain outside the permit space during entry operations until relieved by another attendant.
- Communicate with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the permit space.

- Monitor the activities inside and outside the permit space to determine if it is safe for entrants to remain in the space. Order the authorized entrants to evacuate the permit space immediately under any of the following conditions:
 - ◀ You detect a prohibited condition;
 - ◀ You detect the behavioral effects of hazard exposure in an authorized entrant;
 - ◀ You detect a situation outside the space that could endanger the authorized entrants; or
 - ◀ You cannot effectively and safely perform all your required duties.
- Summon rescue and other emergency services as soon as you determine that authorized entrants may need assistance to escape from permit space hazards.
- Take the following actions when unauthorized persons approach or enter a permit space while entry is underway:
 - ◀ Warn the unauthorized persons that they must stay away from the permit space;
 - ◀ Advise the unauthorized persons that they must exit immediately if they have entered the permit space; and
 - ◀ Inform the authorized entrants and the entry supervisor if unauthorized persons have entered the permit space.
- Perform non-entry rescue as specified by the rescue procedure.
- Avoid any activities that might interfere with the your primary duty to monitor and protect the authorized entrants.

ENTRY SUPERVISORS

- Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.
- Verify, by checking that the appropriate entries have been made on the permit, that all tests specified by the permit have been conducted and that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin.

- Terminate the entry and cancel the permit if the entry operations covered by the entry permit have been completed or a condition that is not allowed under the entry permit arises in or near the permit space.
- Verify that rescue services are available and that the means for summoning them are operable.
- Remove unauthorized individuals who enter or who attempt to enter the permit space during entry operations.
- Determine, whenever responsibility for a permit space entry operation is transferred and at intervals dictated by the hazards and operations performed within the space, that entry operations remain consistent with the terms of the entry permit and that acceptable entry conditions are maintained.

COMPETENT PERSONS

- Attend training classes to understand the hazards of atmospheres which can develop in confined spaces, the methods of testing those atmospheres, and protective measures for ensuring worker safety.
- Test the atmospheres in confined spaces to ensure that they are safe for worker entry. Document all test results.
- Maintain and calibrate all testing equipment.
- Designate proper protective measures based on test results.

EMERGENCY RESPONSE PERSONNEL

- Attend training classes to understand emergency rescue and first aid/CPR techniques. Simulated rescue training must be done at least once per year.
- Attend training classes given for authorized entrants.
- Rescue any employees or contractors who are in need of such services during work in confined spaces. Use proper techniques and personal protective equipment to ensure personal safety. Provide first aid or CPR as needed.
- Maintain all emergency response equipment in operable condition.

G.

REPORT LIMITATIONS

The scope of this report is limited to the matters expressly covered. This report is prepared for the sole benefit of Hercules Marine Services Corporation, and may not be relied upon by any other person or entity without the written authorization of Pilko & Associates, Inc.

In preparing this report, Pilko & Associates, Inc. has relied on information derived from secondary sources and personal interviews. Except as set forth in this report, Pilko & Associates, Inc. has made no independent investigation as to the accuracy or completeness of the information derived from the secondary sources and personal interviews and has assumed that such information was accurate and complete.

All recommendations, findings, and conclusions stated in this report are based upon facts and circumstances as they existed at the time that this report was prepared (e.g., Federal, State, and local laws, rules, regulations, market conditions, energy costs, wage rates, political climate, and other matters that Pilko & Associates, Inc. deemed relevant). A change in any fact or circumstance upon which this report is based may adversely affect the recommendations, findings, and conclusions expressed in this report.

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APPENDIX A

CONFINED SPACE ENTRY PERMIT				
Permit Space to be Entered:		Purpose of Entry:		
Date/Time of Entry: Date: Time:	Authorized Duration of Entry: (Note: new permit required at beginning of each shift)			
Names of Authorized Entrants:		Names of Attendants:		Entry Supervisor:
Hazards of the Confined Space:				
Hazard Control Measures Before Entry:				
Isolation: Warning Sign Posted:		Ventilation: Hazard Communication Training:	Draining/Stripping: Other:	
Acceptable Entry Conditions: Oxygen: Minimum 20% LEL: Maximum 0% Chemical Exposure: Below applicable PEL/TLV				
	Reading	Time	Test Equipment	Tester (initials)
Test Results - Oxygen (%)	_____ _____ _____ _____	_____ _____ _____ _____	_____ _____ _____ _____	_____ _____ _____ _____
Test Results - LEL (%)	_____ _____ _____ _____	_____ _____ _____ _____	_____ _____ _____ _____	_____ _____ _____ _____
Test Results - PEL/TLV (ppm)	_____ _____ _____ _____	_____ _____ _____ _____	_____ _____ _____ _____	_____ _____ _____ _____
Personal Protective Equipment Required for Entry:				
Respiratory Protection: Boots:		Coveralls: Chemical Goggles:	Slicker Suit/Gloves: Other:	
Communications Procedures for Entrants/Attendants:				
Emergency Procedures/Equipment:				
Hot Work Permit: Required: Yes No Available: Yes No				
Entry Authorized By:			Date:	Time:
Entry Terminated By:			Date:	Time:
Permit not valid unless signed by Entry Supervisor. Post copy of permit at job site. Maintain copy in office. Return completed permit to office when job is finished.				

APPENDIX B

CONFINED SPACE ENTRY PERSONNEL

Authorized Entrants

All Personnel

Entry Supervisors

J. Gonzales
J. Jackson
C. Duarte
G. De La Rosa

Attendants

J. Gonzales
J. Jackson
C. Duarte
G. De La Rosa

Competent Persons (For Testing Atmosphere)

J. Comacho
S. Petit
R. Rodriguez

Emergency Response

J. Gonzales
J. Jackson
C. Duarte
G. De La Rosa

APPENDIX C

CONFINED SPACE ENTRY EQUIPMENT

Testing Equipment

Model 2A MSA Explosimeter, Serial 75887
Model 2A MSA Explosimeter, Serial
Model K25 Bacharach oxygen meter, Serial TK0536
Model 21/31 Draeger Multigas Detector
Detector tubes - (to be added)

Ventilating Equipment

Coppus Jectair 6 air blowers (12-15 blowers)
Compressed air system: 4 stationary compressors
1 portable compressor
6 compressed air tanks

Personal Protective Equipment

Scott full face piece respirators equipped with Scott canisters 631-OV (NIOSH Approval TC-14G-104)

American Optical 1/2 face respirators (R6500 NFE respirator) equipped with AO Safety R53A chemical cartridges (NIOSH Approval TC-23C-343)

Industrial Scientific Corp. Lifeline Air System, Model PL-50, with Scott SKA-Pak (5 minute escape SCBA, pressure demand Type C supplied-air respirator with Scot-O-Vista facepiece)

Rubber gloves and boots
Chemical slicker suits (Edmont)
Disposable coveralls (Kappler)
Chemical goggles

Emergency/Rescue Equipment

Harnesses
Retrieval lines
Mechanical retrieval devices

Other

Everready Safety Lanterns, No. 459

APPENDIX D

APPLICATION OF OSHA's PERMIT-REQUIRED CONFINED SPACES REGULATION TO HERCULES MARINE SERVICES CORPORATION

BACKGROUND - OSHA REGULATION

The OSHA Permit-Required Confined Spaces Regulation (29 CFR 1910.146) was promulgated in 1993. The regulation contains requirements for identification of permit-required confined spaces, establishment of a permit-required confined space program, training, and rescue/emergency services. Permit-required confined spaces are defined as those spaces that have one or more of the following characteristics:

- 1) contains or has a potential to contain a hazardous atmosphere;
- 2) contains a material that has the potential for engulfing an entrant;
- 3) has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which sloped downward and tapers to a smaller cross-section; or
- 4) contains any other recognized serious safety or health hazard. Companies who have confined spaces that meet these characteristics must comply with the regulation.

However, alternate procedures can be used if the only hazard posed by the confined space is an actual or potential hazardous atmosphere and the employer can demonstrate that continuous forced air ventilation alone is sufficient to maintain the permit space safe for entry.

BACKGROUND - HERCULES MARINE SERVICES CORPORATION

Hercules Marine Services cleans and repairs chemical barges. Cleaning procedures have been developed and employees receive training regarding the hazards of chemicals in the barge and protective measures to be used. The cleaning operation can often take place without employees entering the cargo tanks. However, tank entry is required at times to complete the cleaning. If this is necessary, oxygen levels and explosive levels of hydrocarbons are measured to determine if safe entry can be made. This testing is done from outside the tanks. Toxic levels of chemicals are not measured, but employees typically wear air-purifying respirators when they enter the tanks.

After a barge has been thoroughly cleaned, a marine chemist tests the environment in the tanks for oxygen, explosive levels of hydrocarbons and toxic levels of chemicals. Again, this testing is done from outside the tanks. If the atmospheric conditions are acceptable, he certifies that the tanks can be entered safely for maintenance. The tanks are continually ventilated during the maintenance work which may involve welding and cutting (hot work). If the maintenance work takes several days to complete, Hercules tests the oxygen and explosive levels of hydrocarbons (but not toxic chemical levels) at the beginning of each day. All testing by Hercules is done by a "shipyard competent person" who has taken the "Marine Gas Hazards Control Program" from the National Fire Protection Association.

Hercules employees may also do maintenance work in the void tanks of barges. Although no chemicals would normally be involved, these tanks could conceivably be considered "permit-required confined spaces" if a hazardous atmosphere develops during maintenance work.

APPLICATION OF REGULATION TO HERCULES

Based on the initial review, it would appear that any entry of Hercules personnel into the barge cargo tanks for cleaning purposes would be considered a "permit-required confined space entry". A prudent approach would be for Hercules to operate on this premise and comply with all sections of the OSHA standard. However, if the company wishes to demonstrate through atmospheric testing that ventilation is sufficient to control hazardous atmospheres in the tanks, alternate procedures which avoid the use of OSHA-approved permits can be adopted. The OSHA requirements for danger signs and training of employees would still apply.

After a marine chemist has certified that the cargo tanks are safe for maintenance work, these spaces can be considered as "non-permit confined spaces" unless maintenance work that could generate a hazardous atmosphere is done. Welding in the tanks would be considered such work.

With regard to the void tanks, these would be considered "permit-required confined spaces" if a hazardous atmosphere could be generated during maintenance work in the tanks, such as during welding.

COMMENTS/RECOMMENDATIONS FOR EACH SECTION OF THE STANDARD

Section (a) - Scope and Application

This section states that the confined space standard applies to General Industry.

Section (b) - Definitions

This section contains definitions pertinent to the regulation.

Section (c) - General Requirements

This section requires employers to identify permit-required confined spaces, inform exposed workers, and develop and implement a written permit space entry program. Alternate procedures may be used if the employer uses ventilation to maintain a safe atmosphere. Permit spaces may be reclassified as non-permit spaces if conditions change so there are no hazards. Contract employees must be informed of hazards and coordinated to ensure safety.

Comments

Barge cargo tanks entered by Hercules employees for cleaning out chemicals would be considered permit-required confined spaces. A prudent approach would be for Hercules to operate on this premise and implement all the OSHA requirements. However, if the company wishes to demonstrate through atmospheric testing that ventilation is sufficient to control hazards in the tanks, then alternate procedures that avoid the use of OSHA-approved permits can be adopted. In this case, Sections (d), (e), (f), (h), (i), (j), and (k) would not have to be complied with. The OSHA requirements for training employees and use of danger signs would still apply.

If testing by a marine chemist shows that the confined space no longer contains any hazards, it can be reclassified as a non-permit confined space, unless maintenance work such as welding is done.

Recommendations

- 1) Consider barge cargo tanks which Hercules employees enter for cleaning purposes as "permit-required confined spaces." Tanks which have been certified as safe by a marine chemist can be classified as "non-permit confined spaces" unless maintenance work results in the development of a hazardous atmosphere. Barge void tanks would not be considered permit-required confined spaces unless maintenance work such as welding creates a hazardous atmosphere in them.
- 2) Ensure a warning sign is posted at the opening to each confined space which is being cleaned. The sign should state: DANGER, CONFINED SPACE, DO NOT ENTER UNLESS AUTHORIZED BY PERMIT, or similar language.
- 3) Develop and implement written permit space entry program in accordance with Section (d) of the regulation.
- 4) For maintenance work in a non-permit confined space which extends beyond one day, include testing for toxic chemical levels in addition to the current testing for oxygen and explosive hydrocarbon levels, unless it can be clearly demonstrated

that the space contains no residual chemicals. Hercules "competent persons" should receive training to allow this testing to be done. Reclassify the confined space as a permit-required space if any of this testing indicates a hazardous atmosphere in the tank.

- 5) Ensure that contract employees and any other people who enter permit-required confined spaces are properly trained and coordinated so they can work safely and not endanger anyone else. Document all training.

Section (d) - Permit-Required Confined Space Program

This section requires the employer to implement the measures necessary to prevent unauthorized entry into a permit-required confined space. Hazards of permit spaces must be identified and evaluated before employees can enter them and during entry operations.

The employer must provide, properly maintain, and ensure the proper use of equipment necessary for safe work in confined spaces. Equipment includes testing and monitoring equipment, ventilating equipment, communications equipment, personal protective equipment, lighting equipment, barriers and shields, ladders, and rescue/emergency equipment.

At least one attendant must be stationed outside of the permit space for the duration of the entry operations. If the attendant monitors more than one permit space, he must be able to properly carry out all his duties if an emergency occurs in one or more of the permit spaces.

Procedures must be developed and implemented to coordinate entry operations where employees of more than one employer are working simultaneously in a permit space.

An annual review of the confined space program must be conducted using cancelled permits.

Recommendations

- 1) Review existing cleaning and maintenance procedures and make necessary changes to comply with OSHA confined space requirements.
- 2) Continue to test barge cargo tanks for oxygen and explosive hydrocarbon levels before allowing employees to enter the tanks for cleaning purposes. Also, test for toxic chemical levels to ensure that respiratory protection is adequate. Take additional measurements during the work as necessary to ensure that safe conditions are being maintained.
- 3) Maintain a written inventory of all equipment covered under this standard. Maintain records of all calibration and maintenance work regarding this equipment.

- 4) Conduct and document an annual review of the confined space program using cancelled permits.

Section (e) - Permit System

This section requires establishment of a permit system which requires the employer to:

- 1) prepare an entry permit before authorizing entry,
- 2) restrict the duration of the permit to the time required to complete the job,
- 3) have the permit signed by the entry supervisor,
- 4) post the entry permit at the entry portal, and
- 5) cancel the permit when the work is completed or if conditions develop which are not allowed by the permit.

Recommendation

- 1) Establish a permit system that covers points (1) - (5) listed above for work where employees must enter the barge tanks for cleaning out chemicals or conducting hot work.

Section (f) - Entry Permit

This section lists 15 requirements of an entry permit.

Recommendation

- 1) Establish an entry permit which meets the requirements of this section.

Section (g) - Training

This section establishes training requirements to ensure safe work during entry to confined spaces. The section requires both initial training and training whenever there is a change in duties or work conditions.

Comments

Hercules currently conducts hazard communication training before each barge cleaning. This training is properly documented.

Recommendation

- 1) Supplement existing training with training regarding the OSHA Confined Space Regulation; the permit system; changes in tank cleaning procedures; the specific

of authorized entrants, attendants, and entry supervisors; and emergency operations. Document all training.

(h), (i), (j) - Duties of Authorized Entrants, Attendants, Entry Supervisors

sections outline the duties of each position.

Recommendation

- 1) Identify positions of individual employees and provide required training. Document all training.

Section (k) - Rescue and Emergency Services

This section requires that employers establish rescue/emergency services when work is done in permit-required confined spaces. When employees are designated to perform rescue services, they must receive proper training regarding rescue techniques, rescue equipment, personal protective equipment, basic first aid and cardiopulmonary resuscitation (CPR). They must also receive the training required for authorized entrants specified in Section (h). Each member of the rescue service must participate in a simulated rescue at least once every 12 months.

When outside services are designated to perform rescue services, they must be provided information regarding confined spaces and hazards at the facility.

Retrieval systems or methods must be used to facilitate non-entry rescue unless this would increase the overall risk or not contribute to the rescue operations. Authorized entrants must use a chest or full-body harness connected to a retrieval line.

Recommendation

- 1) Designate employees to perform rescue/emergency services and provide the necessary training and equipment to perform the work safely.